

Ozone and temperature profile comparisons between Aura MLS and NCEP Global Data Assimilation System (GDAS)

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Purposes

- NCEP GDAS uses radiance from multi satellites/instruments (**HIRS, AMSU, GOES, AIRS**) for temperature analysis, which can be used to validate the MLS temperature.
- NCEP GDAS uses SBUV/2 ozone profile information (**NOAA-16 and -17**), which lacks data in the polar night and data are less reliable in the LS/UT region. MLS ozone data can be used to validate GDAS ozone analyses.

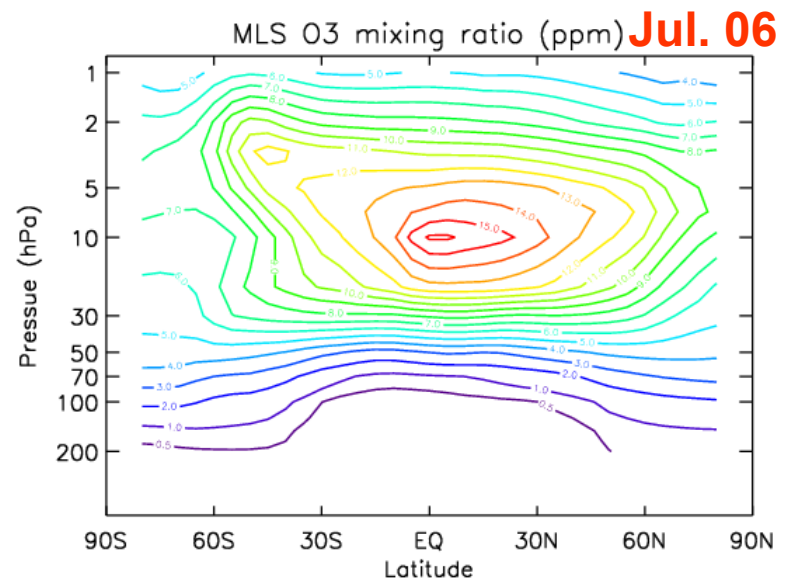
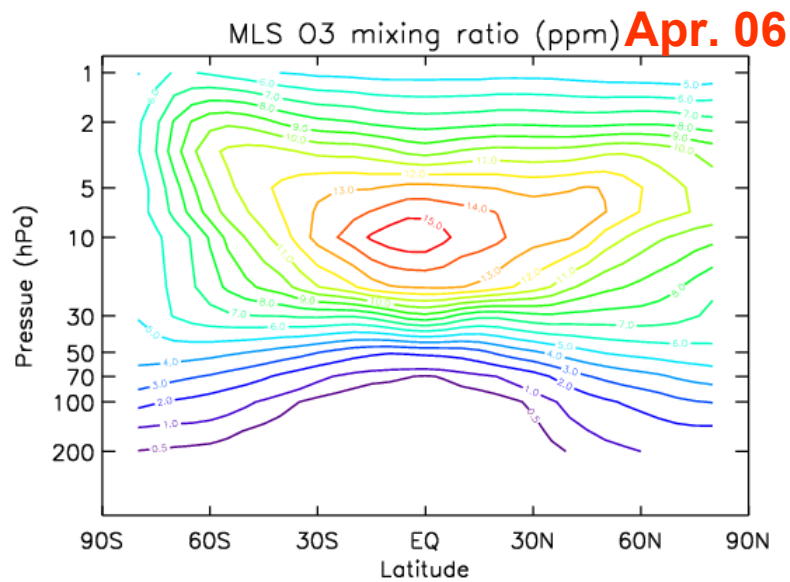
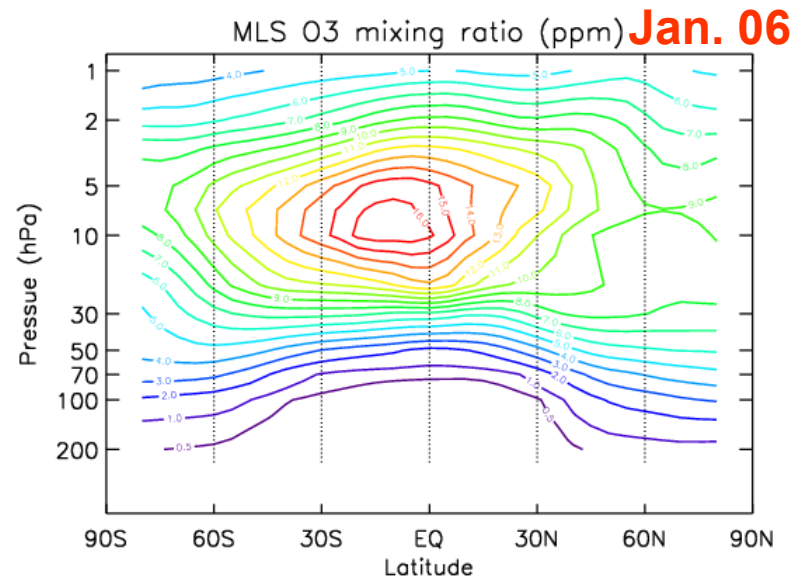
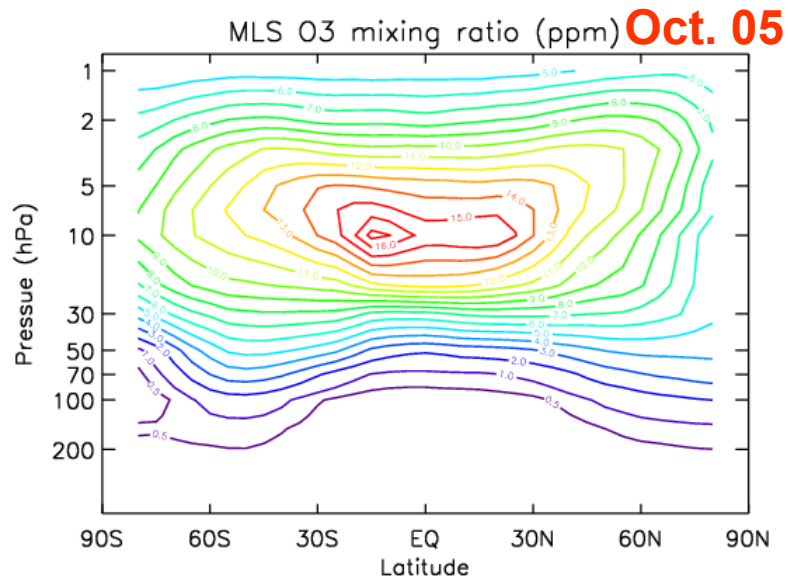


Data

- Time period: October 2005, January, April, and July 2006
- Vertical range for comparison: 200 – 1 hPa
- MLS data (v1.5) are binned into 5 degree latitude zones and interpolated to NCEP GDAS layers
- GDAS data (3D-VAR) are taken from 00Z zonal average
- CPC 12Z temperature analyses also compared

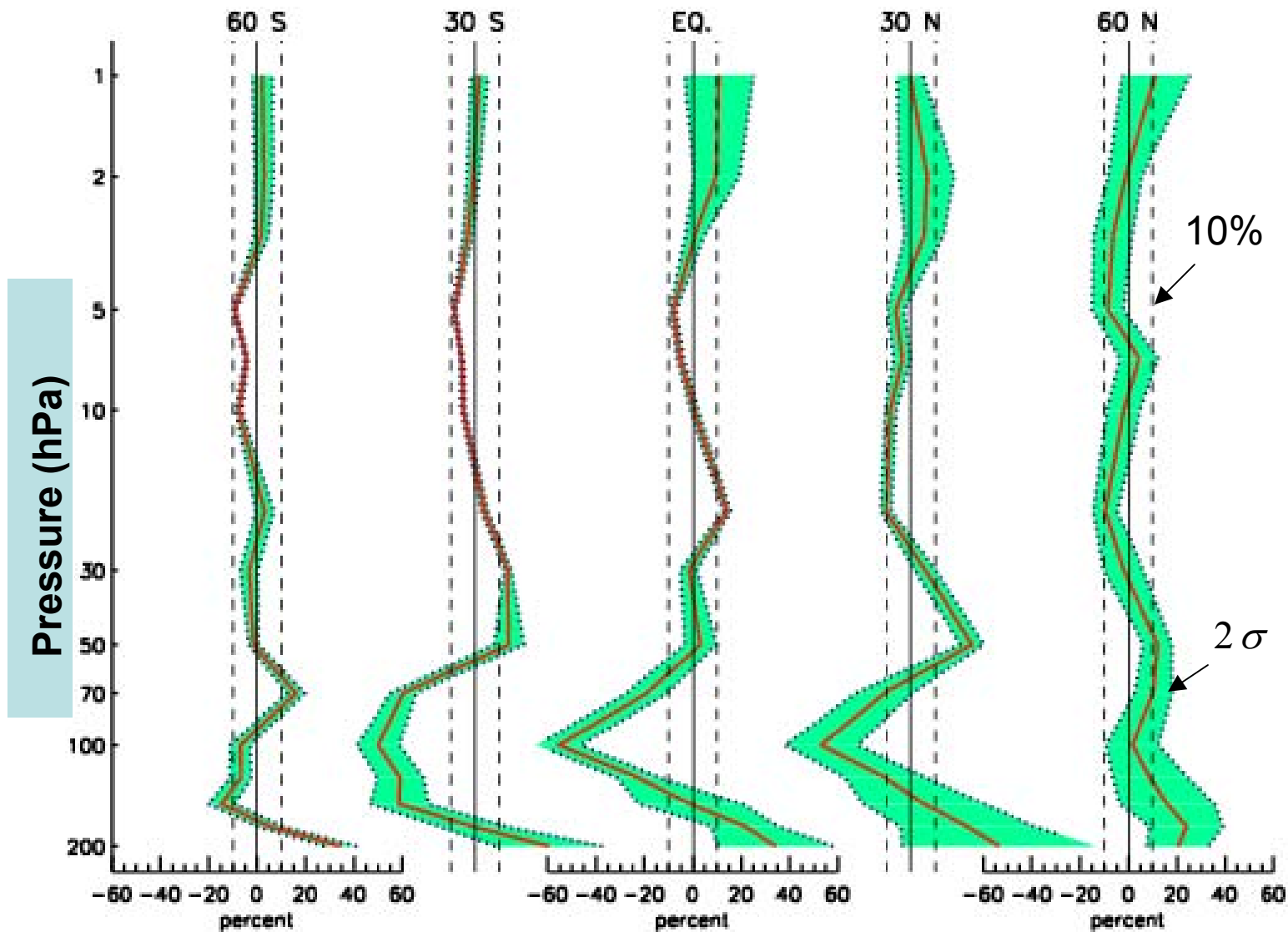


MLS ozone mixing ratio



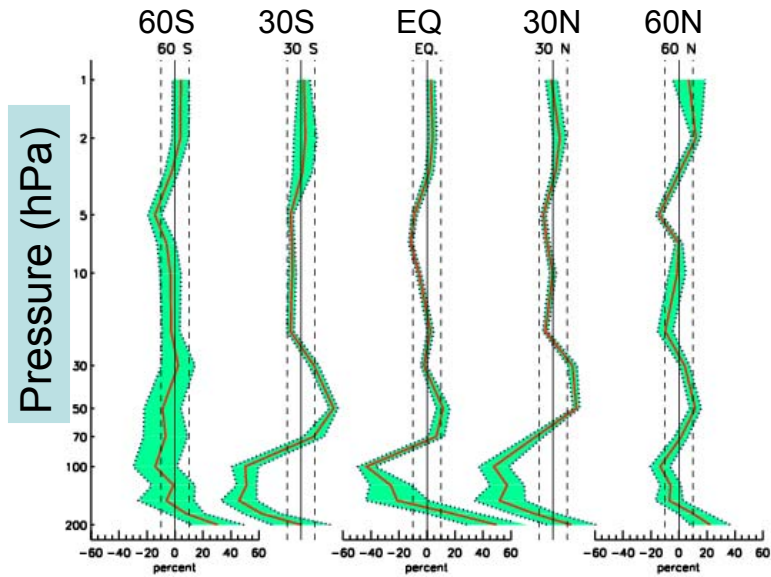
(MLS – GDAS) / GDAS

January 2006

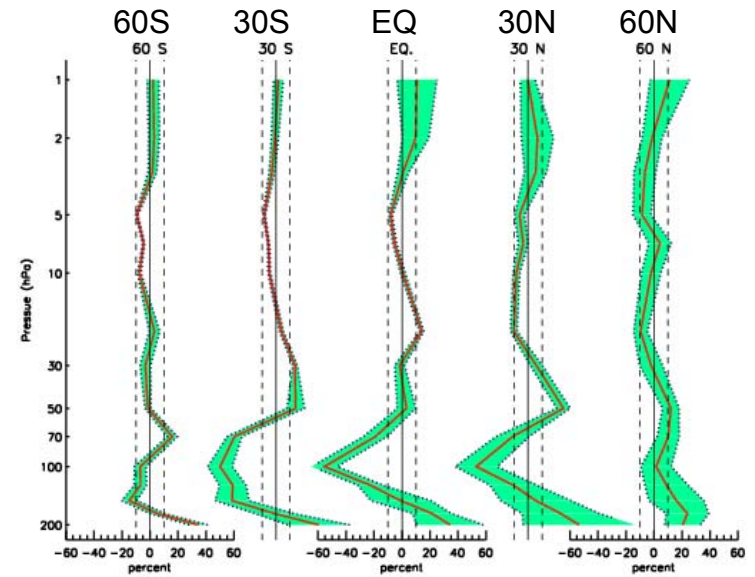


(MLS – GDAS) / GDAS

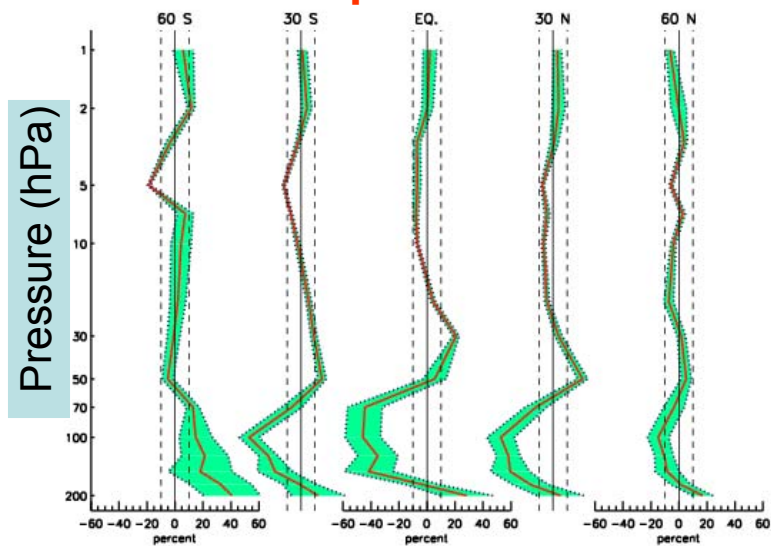
October 2005



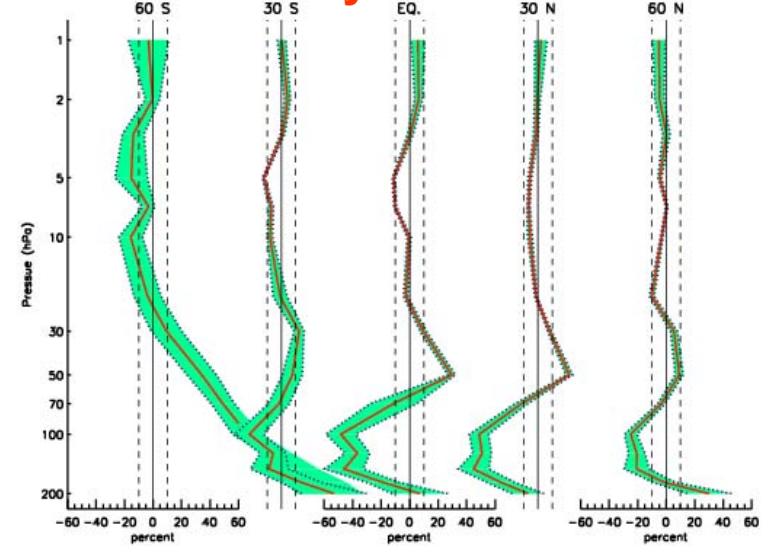
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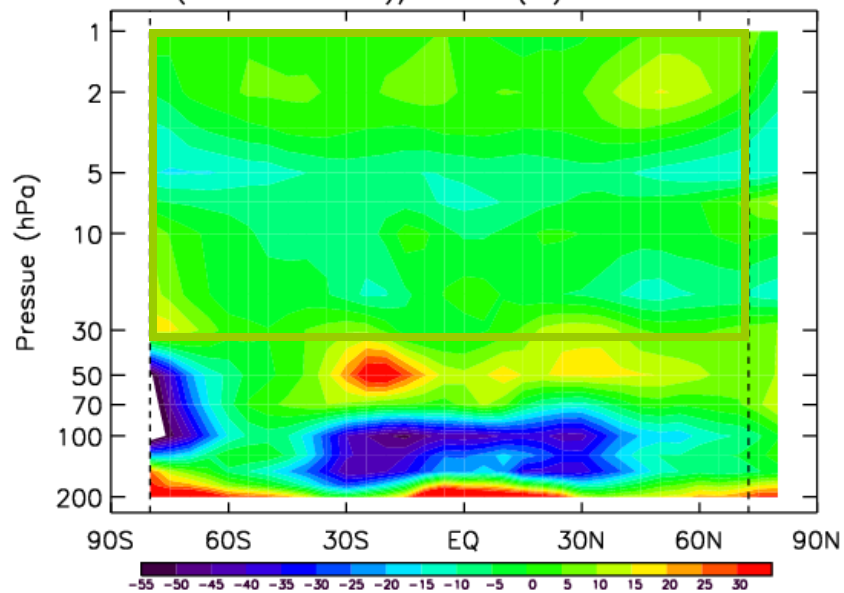
April 2006



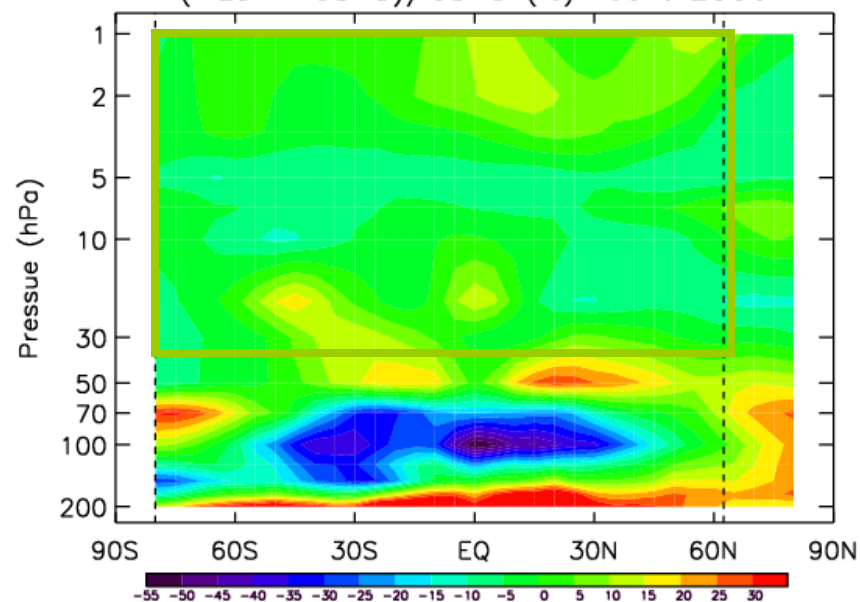
July 2006



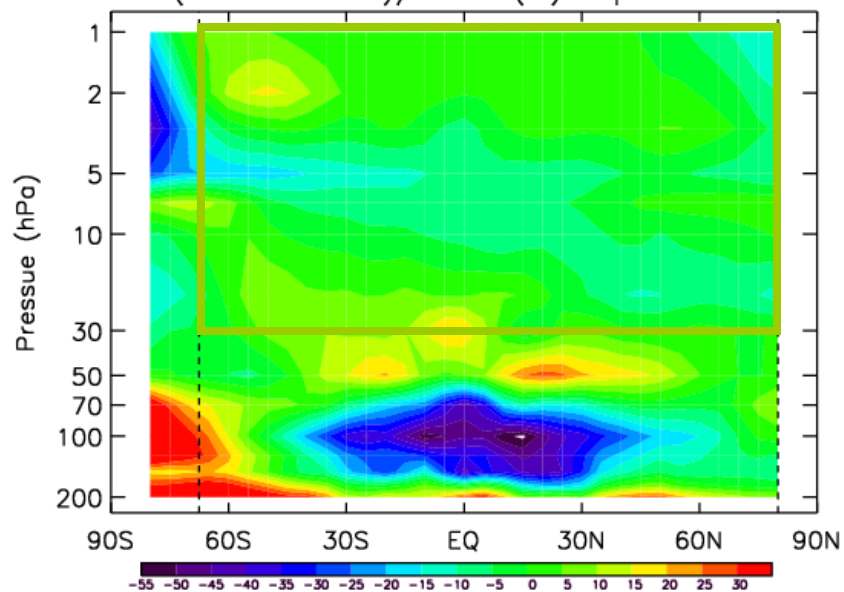
(MLS - GDAS)/GDAS (%) Oct. 2005



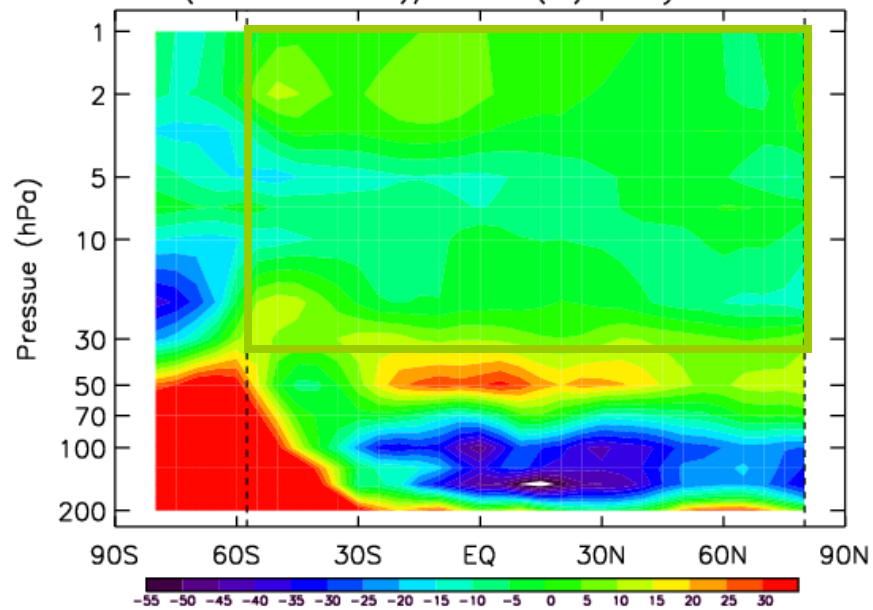
(MLS - GDAS)/GDAS (%) Jan. 2006



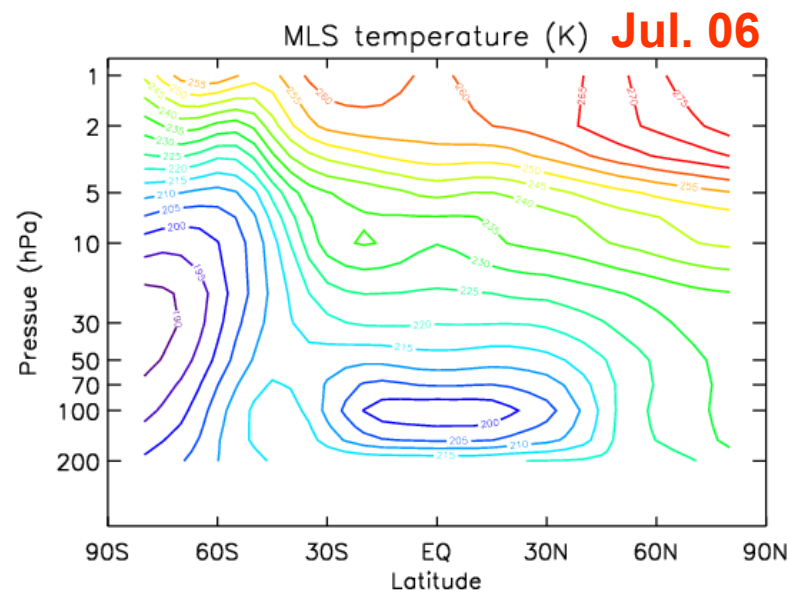
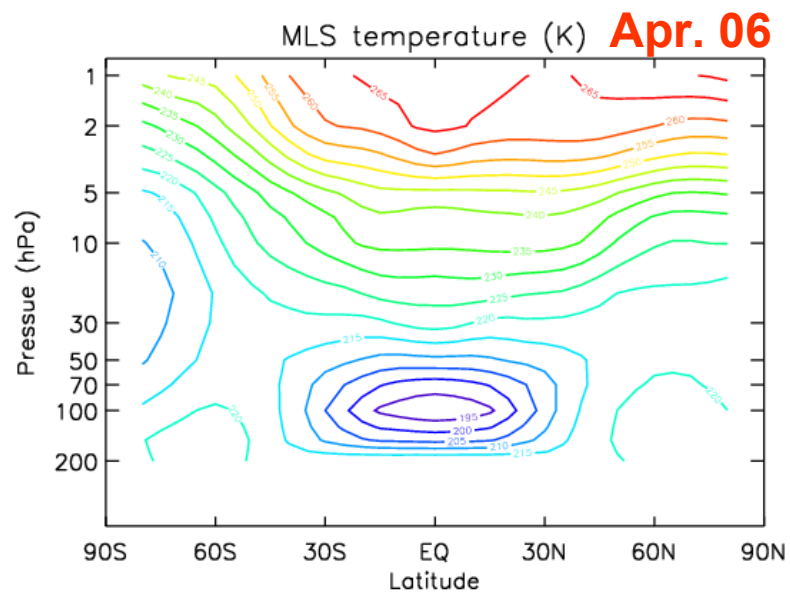
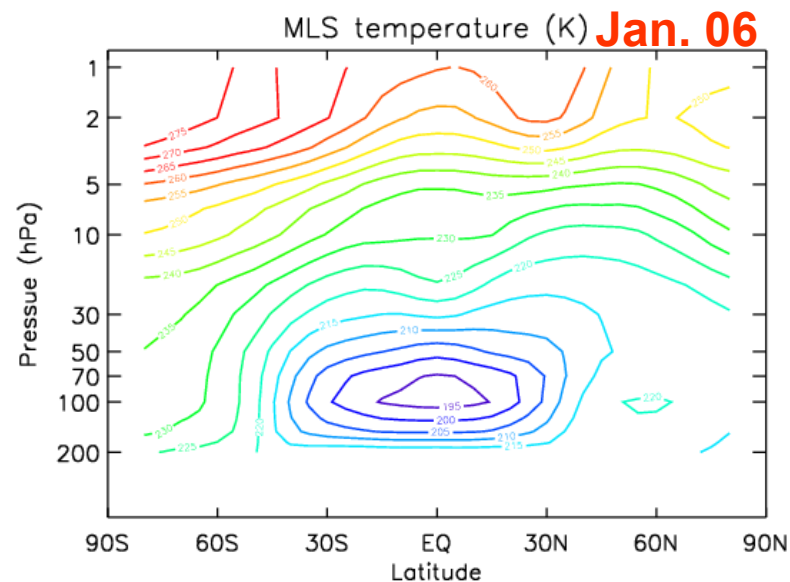
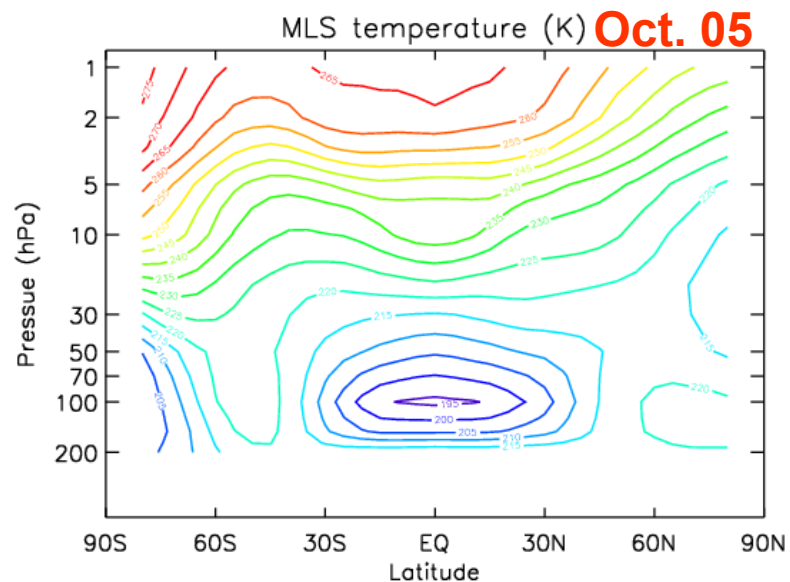
(MLS - GDAS)/GDAS (%) April 2006

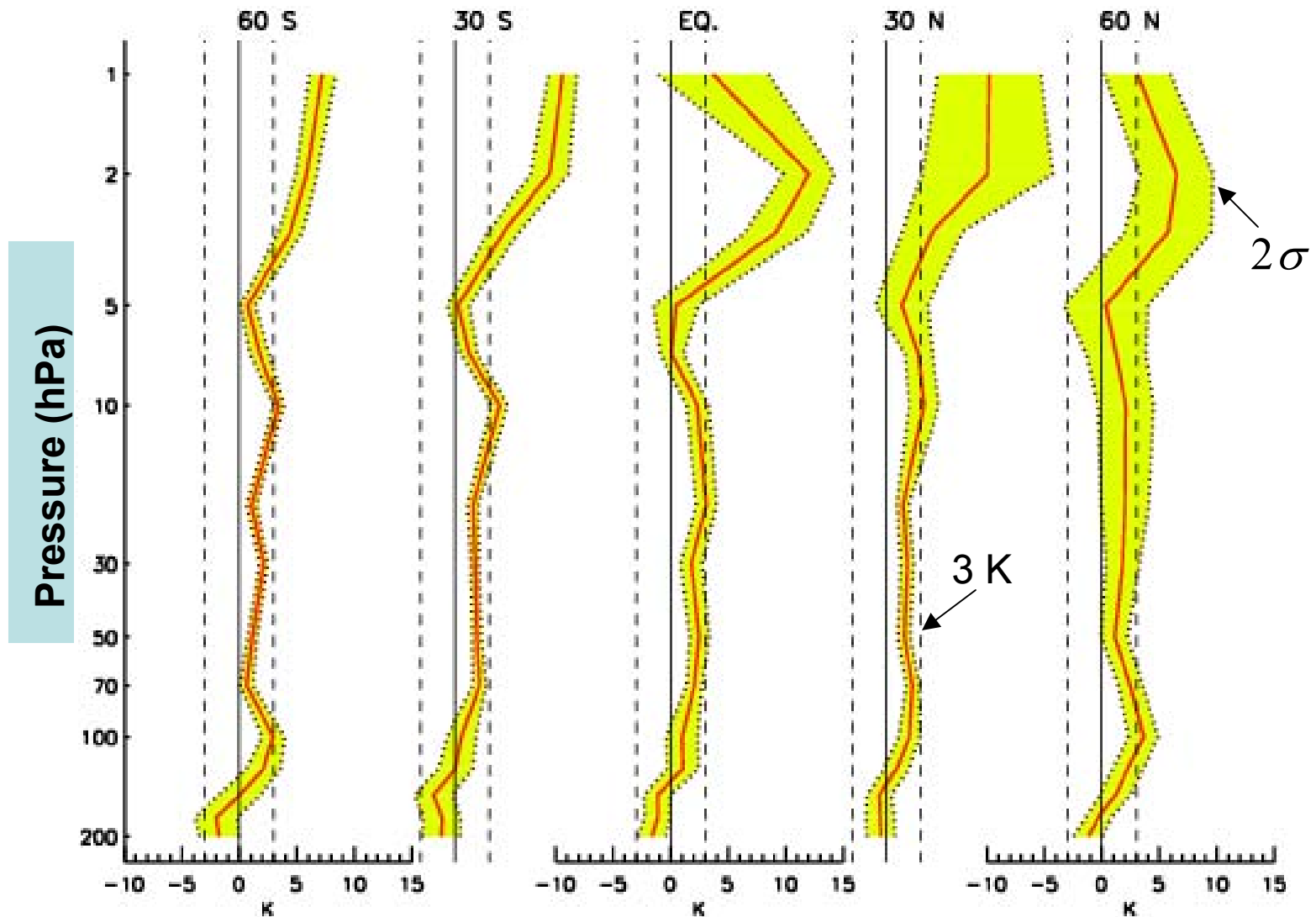


(MLS - GDAS)/GDAS (%) July 2006



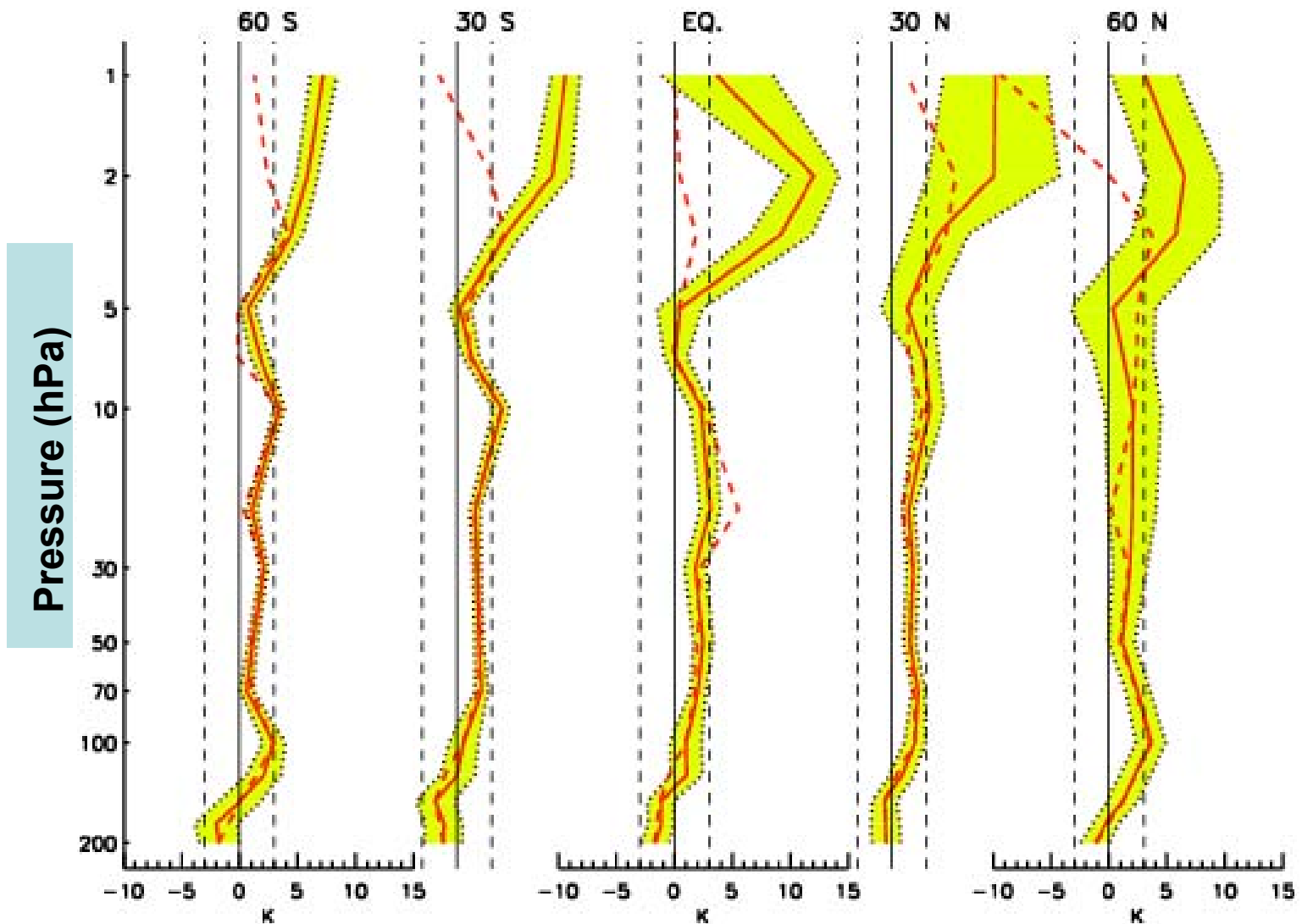
MLS temperature





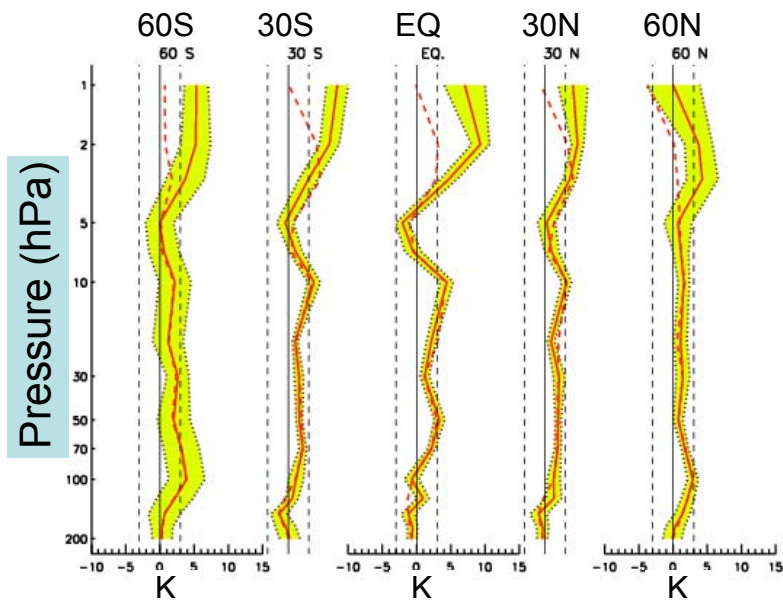
MLS – GDAS January 2006

Dash lines are for MLS – CPC

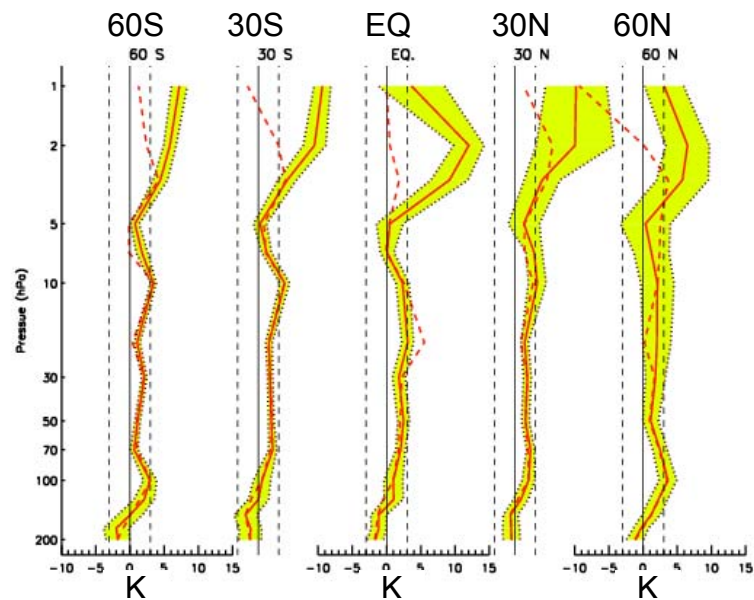


MLS – GDAS

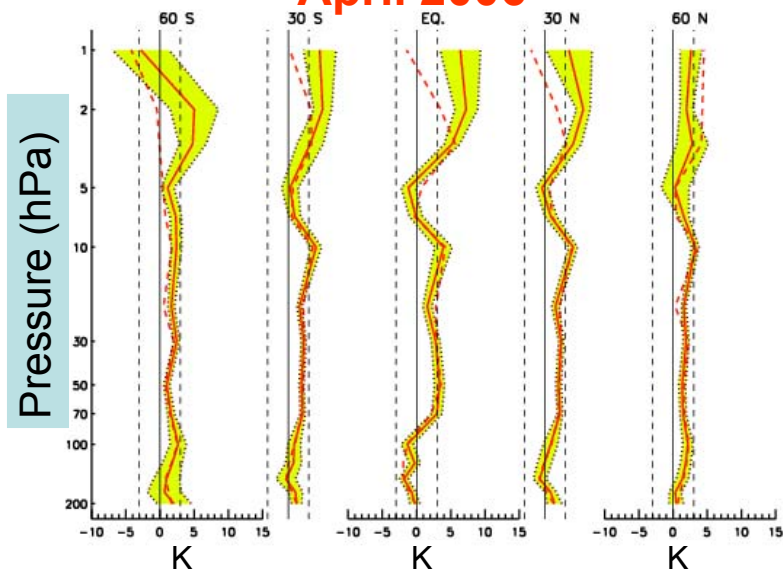
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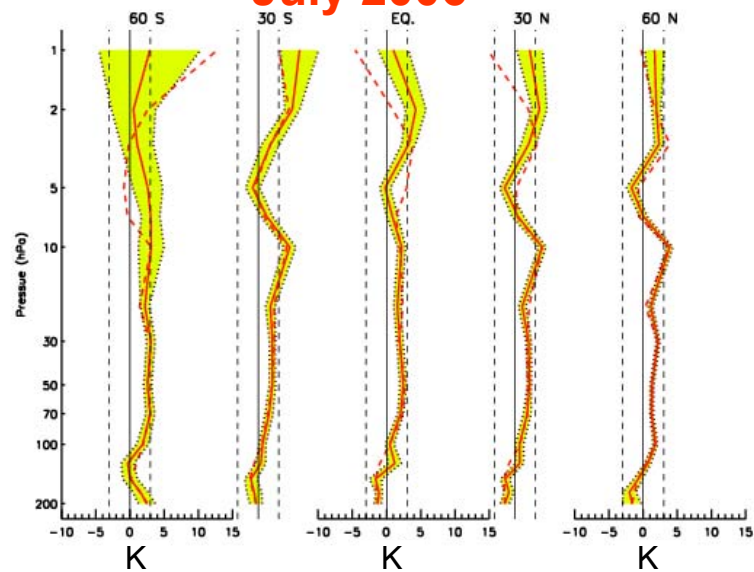
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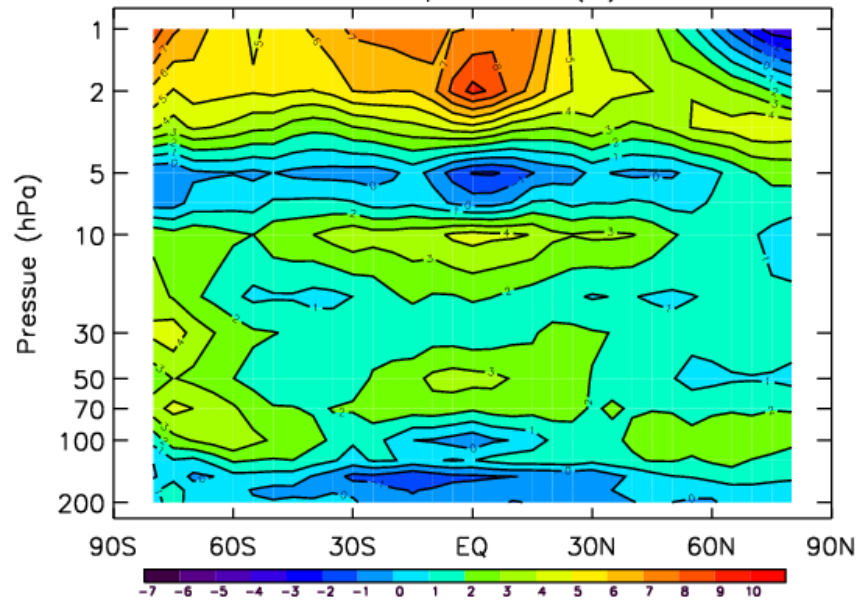
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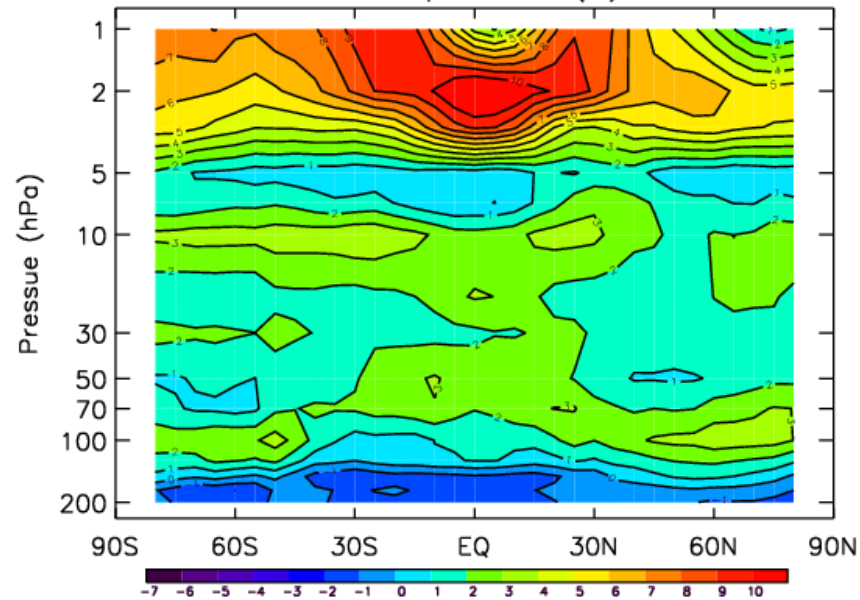
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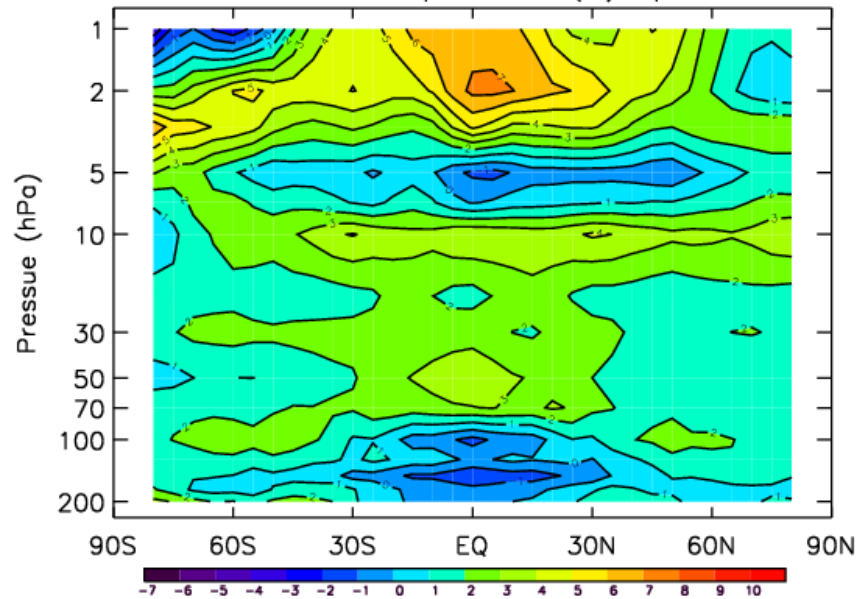
MLS – GDAS temperature (K) Oct. 2005



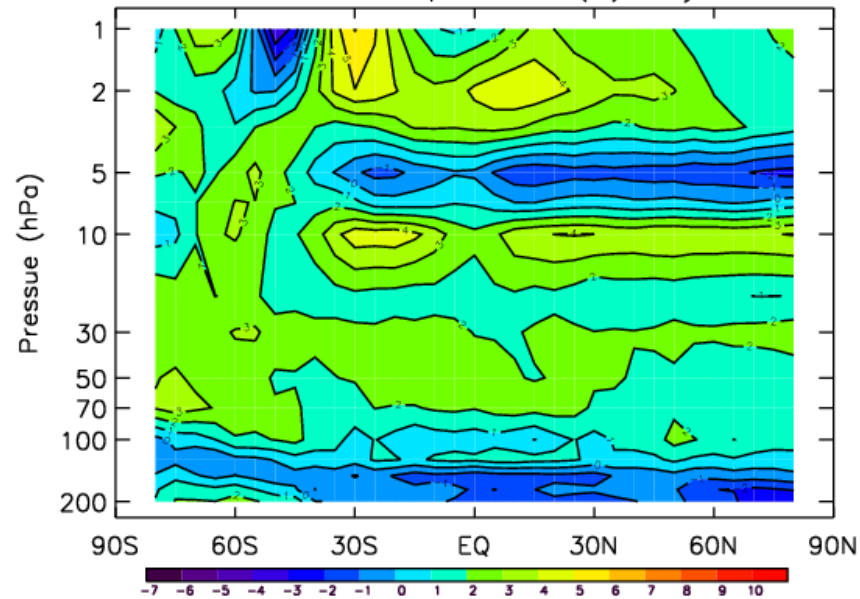
MLS – GDAS temperature (K) Jan. 2006



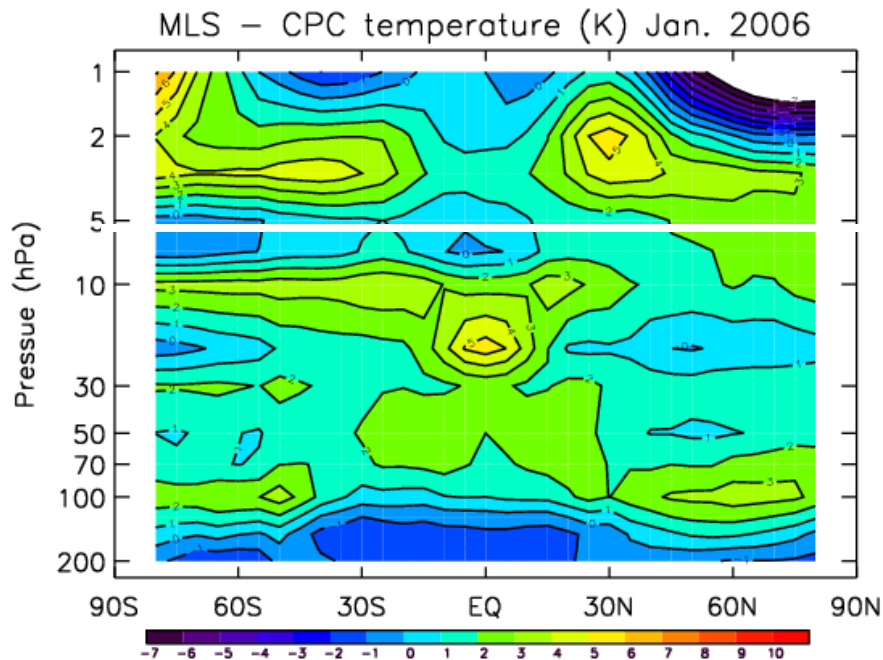
MLS – GDAS temperature (K) April 2006



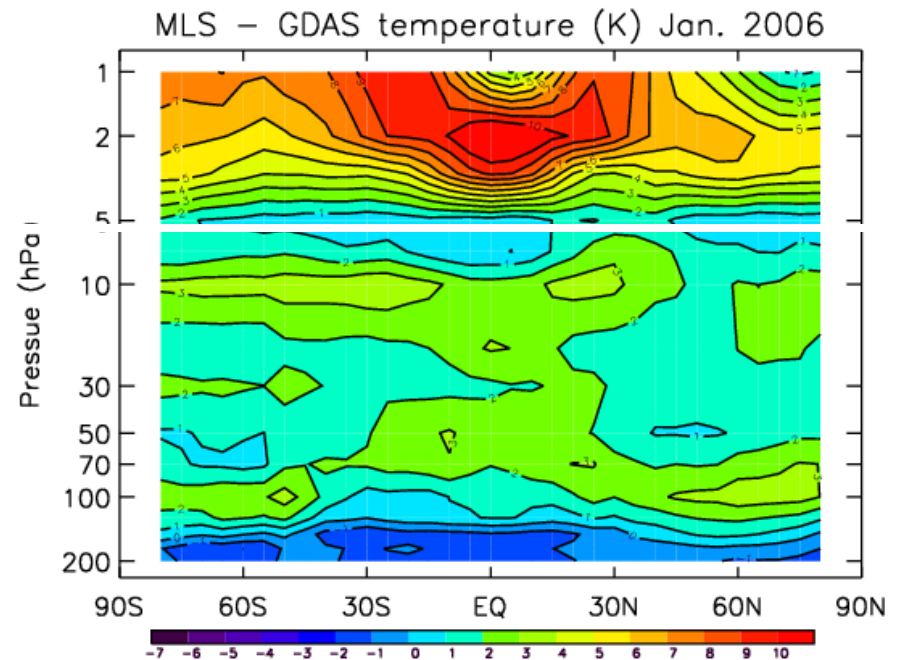
MLS – GDAS temperature (K) July 2006



MLS - CPC



MLS - GDAS



Below 5 hPa: CPC uses GDAS 12Z.

Above 5 hPa: CPC uses AMSU only, objective analysis; **GDAS** uses HIRS, GOES and AIRS (no AMSU), 3D VAR assimilation.

Summary

- MLS and GDAS ozone profiles differ largely ($\sim 50\%$) in the polar night and the LS/UT region, where GDAS has no or less accurate ozone data input.
- In the middle to upper stratosphere where SBUV/2 accuracy and resolution are comparable to MLS, the GDAS ozone agrees well with the MLS (within $\sim 10\%$).
- MLS temperature is generally warmer than the GDAS by $1\sim 3\text{K}$ (maximum of $\sim 10\text{K}$ in the upper stratosphere in January).

